

First Year (Natural Science)

Course: Organic Chemistry (Chem 103)

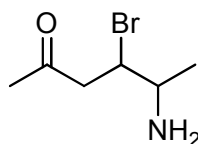
Answer **all** questions: (90 Marks)

Date: 01-06-2013

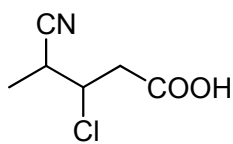
Time: 3 hrs.

(exam in 5 pages)

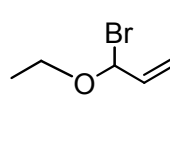
(1) (i) Write the IUPAC names of the following compounds: (20 marks)



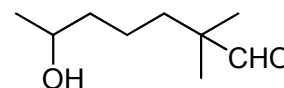
(a)



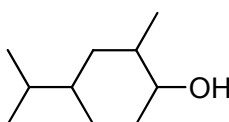
(b)



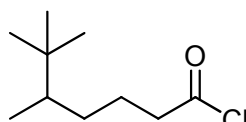
(c)



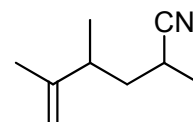
(d)



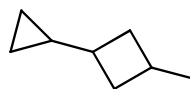
(e)



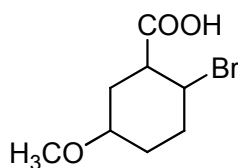
(f)



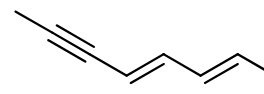
(g)



(h)



(i)



(j)

(ii) Write the **structures** for the following compounds: (7 marks)

(a) 3,4-diethyl-*N,N*-dimethylhexanamide

(b) acetophenone

(c) Methylene chloride

(d) β -Chloro- γ -hydroxyvaleric acid

(e) styrene

(f) 2-*sec*-butyl-4-*tert*-butyl-1-methylcyclooctane

(g) cyclohexyl formate

(iii) Write the correct IUPAC names for the following compounds: (8 marks)

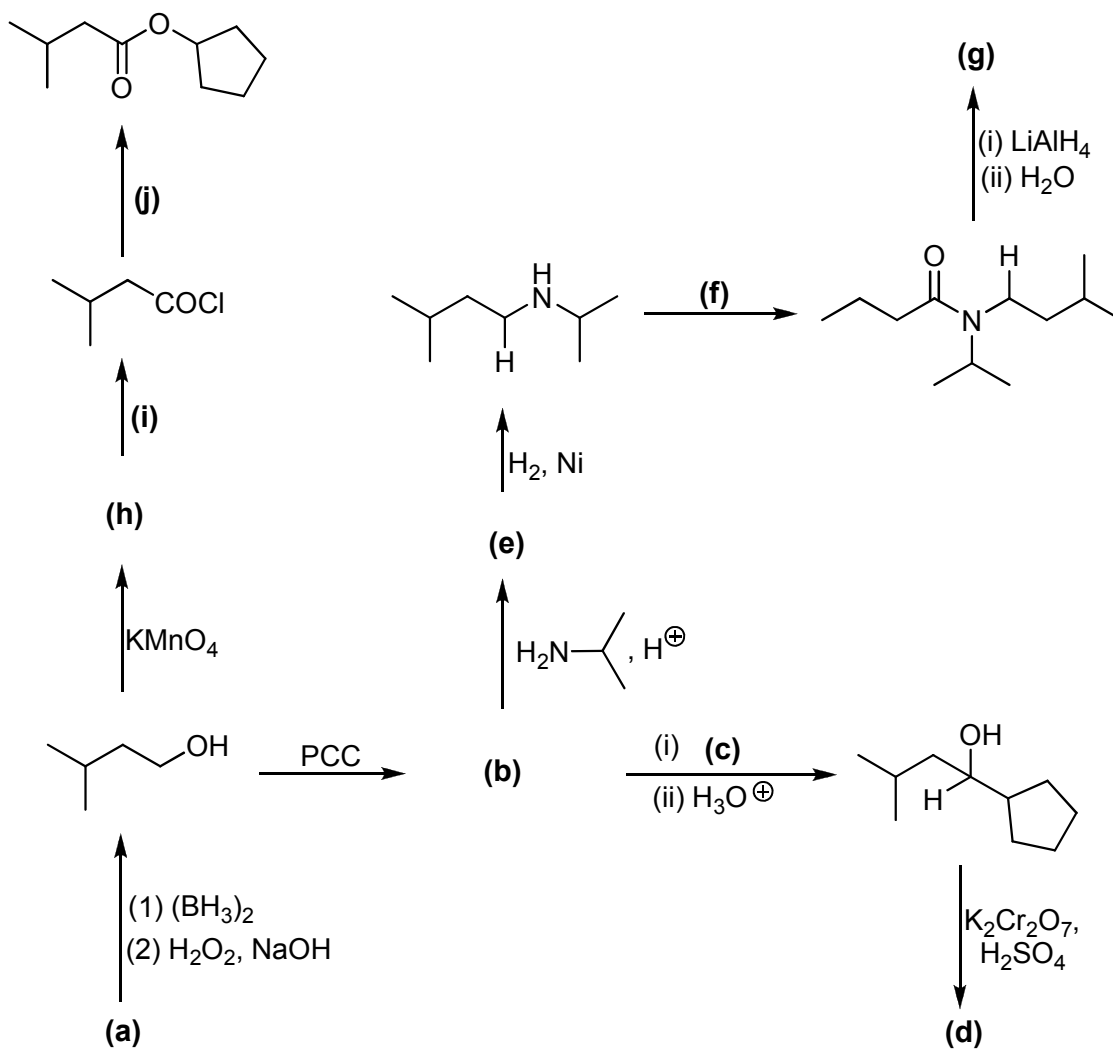
(a) 5-Oxohexan-3-ol

(b) hex-5-en-3-yne

(c) hydroxymethyl methyl ether

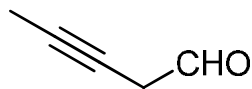
(d) 2-*tert*-Butyl-4-methyl pentane

(2) (i) Complete the following Scheme 1: (10 marks)

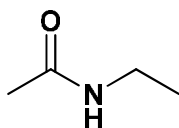


Scheme 1

(ii) Determine the hybridization of each atom in the following compound. (3 marks)



(iii) Draw the complete Lewis structure, including lone pairs, for the following compound. (2 marks)



(3) Choose the correct answer: (20 marks)

(i) Which molecule has a zero dipole moment?

- a) CH_3Cl . b) CH_2Cl_2 . c) CHCl_3 . d) CCl_4 . e) None of these.

(ii) Which of the following radicals is the most stable?

- a) *tert*-butyl radical. b) isobutyl radical. c) n-butyl radical.
d) *sec*-butyl radical. e) isopropyl radical.

(iii) How many structural isomers can be formed by monochlorination of methylcyclohexane?

- a) 1. b) 4. c) 5. d) 3. e) 6.

(iv) What is resonance energy?

- a) It is the hydrogenation energy.
b) It is the extra stability a compound has as a result of resonance.
c) It is the extra energy a compound has as a result of resonance.
d) It is the energy required to delocalize electrons.
e) It is the energy required for resonance.

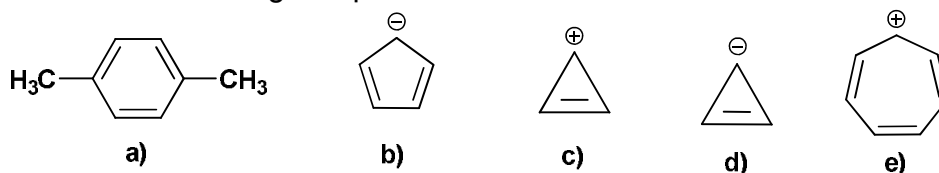
(v) Which of the following compounds cannot form hydrogen bonds between their molecules?

- a) CH_3COOH . b) $\text{CH}_3\text{CH}_2\text{OH}$. c) CH_3OCH_3 .
d) $\text{CH}_3\text{CH}_2\text{CHO}$. e) (c) and (d).

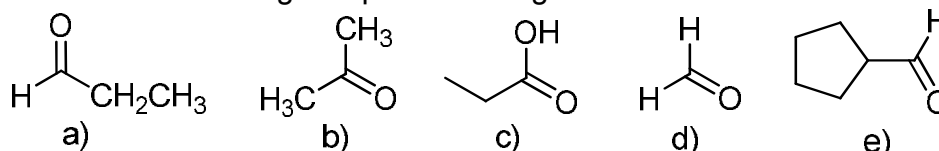
(vi) Which compound would have the highest boiling point?

- a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$. b) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_3$.
c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$. d) $\text{CH}_3\text{CH}_2\text{OCH}(\text{CH}_3)_2$.
e) $\text{CH}_3\text{OCH}_2\text{CH}_2\text{CH}_2\text{CH}_3$.

(vii) Which of the following compounds is not aromatic?



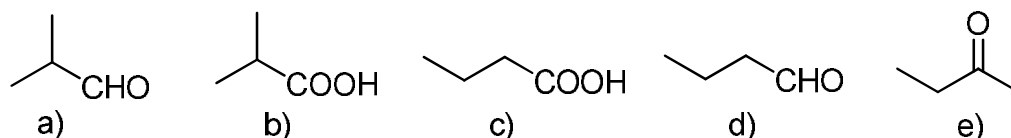
(viii) Which of the following compounds can give iodoform test?



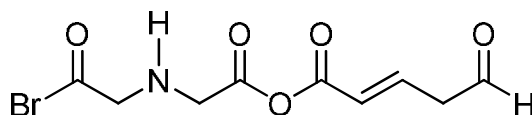
(ix) Catalytic hydrogenation of which of the following will yield 2-methylpentane?

- a) 2-methyl-1-pentene. b) 2-methyl-2-pentene.
c) 4-methyl-2-pentene. d) 4-methyl-1-pentene.
e) All of the above.

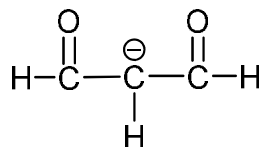
(x) Oxidation of 2-methyl-1-propanol by $K_2Cr_2O_7/H_2SO_4$ gives



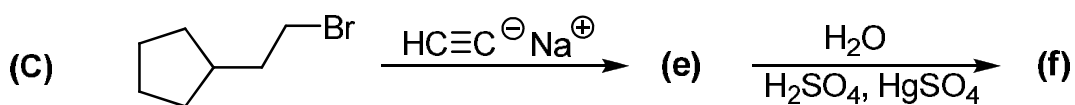
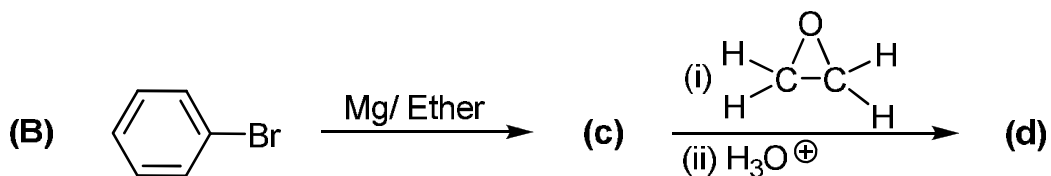
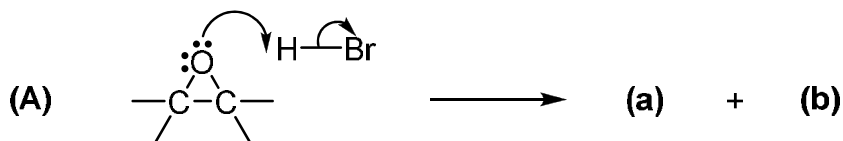
(4) (i) Identify the functional groups in the following compound: (2.5 marks)



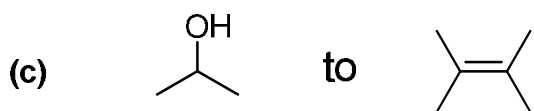
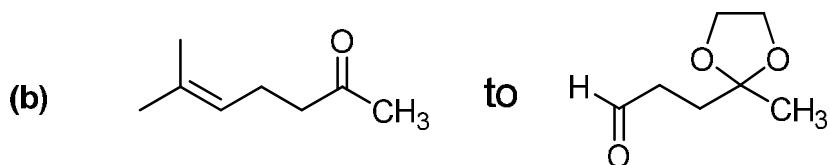
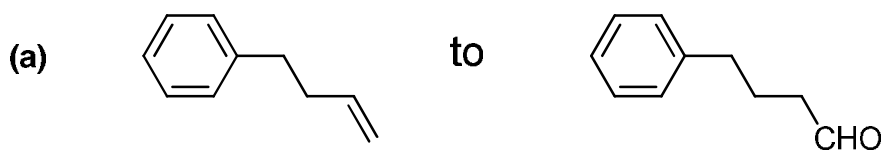
(ii) Draw the important resonance forms. Indicate which structures are major and minor contributors or whether they have the same energy. (3.5 marks)



(iii) Complete the following equations: (5 marks)



(iv) Convert : (9 marks)



With my best wishes

Dr. Ali El-Agamey